

# OBSERVATIONS ON THE MOVEMENT OF TWO CAPTIVE-REARED MUGGER CROCODILES, *CROCODYLUS PALUSTRIS* LESSON WHEN RETURNED TO THE WILD<sup>1</sup>

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Two mugger crocodiles, at six-months age and 56.9 and 54.3 cm size escaped from captivity at GRACU into the river Mahanadi during October 1975. The maximum distance moved during the first three months after escape was 4.0 km and during the entire observation period of 18 months was 10.8 km. Growth of these mugger in the wild was similar to the ones in captivity. It is recommended that mugger when reach a size of about 55 cm can be rehabilitated in the wild for conservation purposes.

## INTRODUCTION

In August 1975 the Gharial Research and Conservation Unit, Tikerpada received fifteen mugger crocodiles (*Crocodylus palustris* Lesson) from Tamil Nadu. Of these fifteen mugger, five hatchlings were collected from Hogenakal waterfall on Cauvery River in Dharmapuri district, five were collected from Kedarhali stream on Moyar River in Nilgiri district and five had hatched in captivity from eggs laid by parents collected from Mettur Dam of Salem district and captive reared in the Madras Snake Park.

Since the mugger varied in size even within the individual group, they were sorted out according to size and kept in three different pools, five per pool. Pools were 2 m × 2 m × 30 cm in size with a slope of 1.3 on one side and with one metre width sand area on all the sides for basking. Ample vegetation was provided as cover to give a feeling of security to the animals. The pools were covered by wire-mesh on

the sides and roof. Adjacent pools were separated by 50 cm vertical wire-mesh partitions.

All mugger had the habit of moving, during the night, along the side of the enclosure facing the river (River Mahanadi), flowing at a distance of about 40 metres on the west. Presumably this resulted from their water orientation behaviour, as reported for gharial, *Gavialis gangeticus* (Gmelin) (Singh 1978).

On 29th October 1975, two mugger juveniles of average size from the largest group escaped by breaking through a rusted portion of the wire-mesh enclosure at a height of 15 cm above the ground. Interestingly, the side through which the mugger had escaped faced the river. This information has been published earlier (Singh 1976) but in the present paper observations relating to the detection of these mugger in the Satkoshia Gorge of Mahanadi and the subsequent movements executed by these juveniles on the next eighteen months in the wild are discussed. It is to be noted that according to a survey made earlier by Bustard (FAO 1974) and the author (unpublished data) the Satkoshia Gorge had seven wild gharial and seven wild mugger. None of the wild mugger were of sizes similar to the ones escaped from

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captivity. Furthermore, observations made by ten Gharial Guards regularly patrolling the river by boat had no report of any other mugger of this size during their observations through eighteen months.

OBSERVATIONS

Exactly one month after their escape, at about 1.5 km downstream from the Unit, a crocodilian track and a faecal pellet were detected on a rocky shore having an interspersed thick deposition of clay. Nature of the spoor, and size of the pug marks and the faecal pellet indicated that the animal that had come out to the spot for basking was a 0.5 m long mugger crocodile (Unpubl. MS.). Since the Gorge didn't have any of its recorded mugger of this size the findings suggested that perhaps both the mugger escaped out from the Unit had come into the Gorge. In confirmation to this assumption, the length of these two escaped juveniles, taken six days before the detection of their escape, was 56.9 cm for one and 54.3 cm for the other.

A week later, two mugger were sighted at this locality both by the fishermen and the Gharial Guards. One of these juveniles moved to the opposite bank, later followed by the second one, and remained near the mouth of a stream that drains off into the river. At that time of the year (March) the spot receives a slow stream of water and it forms an ideal place to harbour a large number of fishes in small pools among half submerged rocks. Observations subsequent to these (25th December 1975 to 9th June 1977) are presented in Table 1.

Table 1 does not show the movements separately for these two juveniles; yet a close study of the data shows that after remaining near the nullah for sometime, both the juveniles moved downstream and then separated, one

TABLE 1

DATE-WISE SIGHTINGS OF THE MUGGER JUVENILES IN SATKOSHIA GORGE

Date	Location	Water level in cm (height above datum)
25.12.75	14.4*	+10.5
30.12.75	14.4	+19.0
4.1.76	14.4	+ 8.5
24.1.76	13.2	+10.5
16.2.76	17.2*	+ 7.0
27.3.76	17.2*	+ 2.0
3.4.76	16.0	+ 1.0
18.5.76	9.6	0
25.6.76	9.6	-14.0
26.7.76	9.0	+622.5
5.8.76	11.2	+640.5
16.8.76	14.0	+954.0
26.8.76	9.6	+534.5
1.9.76	9.6	+511.5
11.9.76	9.6	+425.5
14.9.76	16.0	+454.5
15.9.76	14.0	+477.5
17.9.76	16.0	+256.5
3.10.76	14.0	+60.0
14.10.76	17.6*	+47.0
27.10.76	16.0	+30.0
16.11.76	17.2*	+16.0
24.11.76	16.0	- 3.0
12.12.76	9.6	-16.0
15.12.76	9.6	-16.0
29.12.76	11.2	-26.0
3.1.77	9.6	-23.0
8.1.77	9.6	-14.0
11.1.77	11.2	- 7.0
26.1.77	16.0	-16.0
2.2.77	15.0	-14.0
9.2.77	15.0	+30.0
2.3.77	10.0	+17.0
8.3.77	11.2	+ 9.0
16.3.77	11.2	+22.0
1.4.77	11.2	+17.0
2.4.77	11.2	+12.0
19.4.77	14.4	- 9.0
23.4.77	8.0	-19.0
24.4.77	9.6	-15.0
2.5.77 (10.30 a.m.)	11.2	- 2.0

2.5.77 (11.30 a.m.)	16.0	— 2.0
7.5.77	17.6	—14.0
9.5.77	6.8	—10.0
14.5.77	8.0	—17.0
Upto 9.6.77 no more sightings.		

having moved upstream and the other moving further downstream. The numbers denoted in the Table for different localities refer to the distance of the place from the foot of the gorge. When the place is on the right bank, if viewed from downstream, the number is followed by an asterisk (\*). The numbers in the column showing water level shows the height of the water level above the datum on the particular date at a time close to the time of sighting. During the period of observations, the highest flood was 1323 cm above the datum on 14th August 1976.

During the eighteen months observation recorded in Table 1, there were 22 sightings recorded between the places 14.0 to 17.6, and 23 sightings recorded between 6.8 and 11.2. These data clearly form two different sets of observations, apparently denoting the approximate areas occupied by the two juveniles. The location from which the juveniles had escaped was near 17.5\*. The observations recorded on 11th September 1976 followed by the observation on 14th September 1976, and the observation on 7th May 1977 followed by the observation on 9th May provide further evidence to support the view that the two juveniles had occupied two different areas separated by a distance of 3-11 km. The most convincing evidence, however, is that recorded on 2nd May 1977. On that day one of the juveniles was sighted at 11.2 and the other was sighted at 16.0. The time lapse between the two observations was only an hour.

Irrespective of the fact about which particular juvenile was sighted, the number of sightings

were 2 each during the months December 1975 and January 1976. From February 1976 to July 1976 there were only one sighting a month. During 1976 monsoon the sightings were more — August 3, September 5 and October 3. From November 1976 to February 1977 the sightings were 2, 3, 4 and 2 respectively. During the summer months of March 1977 to May 1977 the sightings were 3, 5 and 5 respectively.

When these mugger were last observed, they were of the size of our average captive juveniles among the largest ones of the remaining thirteen, and they had a definitely slim body when compared to the girth attained in captivity. The length and the weight of the five large juveniles among the remaining thirteen in early May 1977 are given in Table 2.

TABLE 2  
LENGTH AND WEIGHT OF THE FIVE LARGE CAPTIVE  
MUGGER MEASURED DURING EARLY MAY 1977  
(AGE 25 MONTH)

Sl. no.	Length in m	Weight in kg
1	1.40	14.6
2	1.45	16.9
3	1.54	20.9
4	1.56	20.9
5	1.16	9.8

#### DISCUSSION

Table 1 shows that after escape, between the period 25th December 1975 and 3rd April 1976, the maximum distance moved by the two animals was 4.0 km and during the entire eighteen months the movement was through a maximum distance of 10.8 km.

The two different localities occupied by the two juveniles are small stretches of the river, probably because the mugger, if receiving all their requirements, show very restrictive move-

ments, as is observed in the Satkoshia Gorge for its resident adults. To give an example, during 1975 winter an adult mugger estimated to be about 3 m long had dug a tunnel near 6.8 and in the following winter the same mugger had dug the tunnel near about 7.0\* in the opposite bank.

It is noteworthy that these two escaped mugger maintained in the wild the normal growth rates (length) of their captive groups. However, as is normally the case with captive crocodilians the latter were considerably stockier than the wild ones.

Since 1975 Government of India has been offering assistance to several State Crocodile Projects in order to conserve the remaining wild populations of all three species of Indian crocodilians *Gavialis gangeticus* (Gmelin), *Crocodylus palustris* (Lesson) and *Crocodylus porosus* (Schneider). In order to restore good populations in the wild within a short period of time, grow and release techniques are carried out (Bustard in FAO 1975). This technique involves collection of wild-laid eggs, hatchery incubation, rearing the hatchlings in captivity and ultimately rehabilitating the young in suitable protected areas. Rearing of mugger is easy compared to the more delicate gharial. Moreover, mugger juveniles appear to be much more resistant to disease than gharial juveniles. Mugger, however, consume much more food than equal sized gharial (Singh 1978). This, therefore, makes it important to determine a suitable release size for mugger in order to minimise expenditure on husbandry.

When the mugger had escaped at that time

the flood level was 169 cm above the datum (29th October 1975) and the animals were only six months old. Their escape was soon afterwards followed by the winter, and the highest flood (1323 cm: August 1976) came when the mugger reached an age of sixteen months. These observations suggest that mugger of about half a metre length can be released at an age of six months and will readily adapt to the changing conditions of the river. However, the main criterion should be the size of the mugger, not the age. Growth of crocodilians is greatly dependent upon food and temperature besides best husbandry conditions. Therefore, in rehabilitation programmes these factors should be maximum to achieve best growth and thus release the animals into the wild as quickly as possible thereby minimising expense and also possible changes in behaviour. It is observed that during the time of high flood the crocodilians go into the side tributaries or the backwater areas. The Satkoshia Gorge has a number of such places. For that reason it was possible for the juveniles to withstand such high flood, and this also recommends for selection of releasing sites with good zones for retreat during the flood.

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